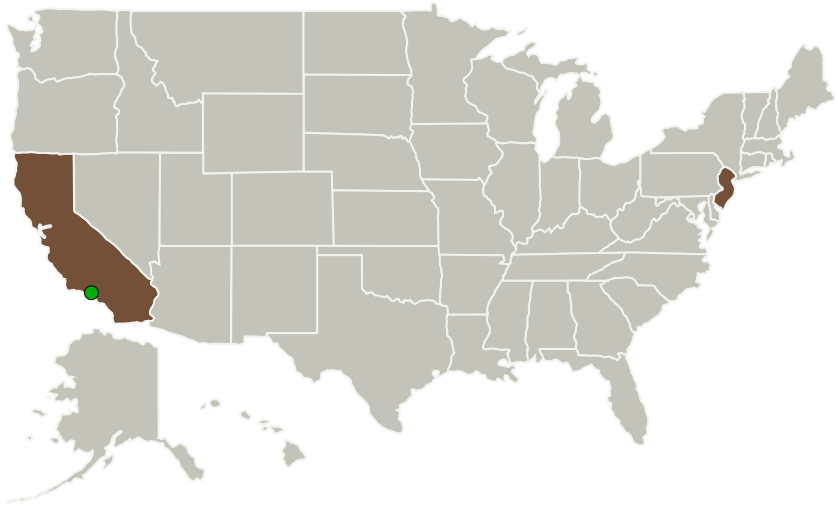
Coded Aperture Techniques for High-Throughput Imaging Spectroscopy, Phase I

Completed Technology Project (2017 - 2017)

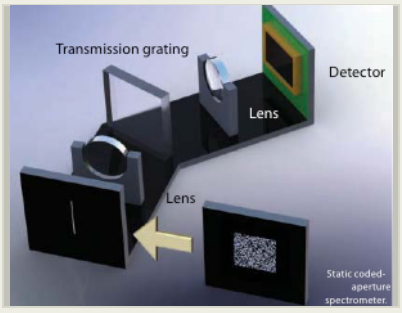
Project Introduction

We propose the use of programmable, two-dimensional (2D) coded apertures for high-throughput imaging spectroscopy. Spatially-varying, 2D, transmissive or reflective encoded mask, such as a hadamard or bernoulli random matrix, can be leveraged to realize high-throughput variants of many standard imaging spectroscopy techniques with throughput enhancements surpassing 50-100x compared to slit-based systems. In addition, recent advances in fast-switching spatial light modulators enable the reprogramming of mask encoding on the millisecond timescale. The combination these two technologies enables a wide array of potential innovations for hyperspectral imaging systems offering high-throughput, compressive measurement, with significant operational-flexibility. In this proposal, we target the application of these techniques to the development of a high-throughput, pushbroom imaging spectrometer for planetary science applications.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Nova Photonics, Inc.	Lead Organization	Industry	Princeton, New Jersey
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California



Coded Aperture Techniques for High-Throughput Imaging Spectroscopy, Phase I Briefing Chart Image

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Primary U.S. Work Locations	
California	New Jersey

Project Transitions

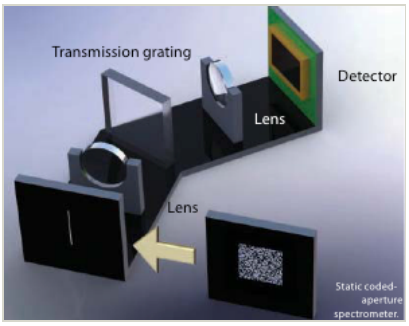
June 2017: Project Start

December 2017: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140766)*

Images



Briefing Chart Image
Coded Aperture Techniques for High-Throughput Imaging Spectroscopy, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/133411)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nova Photonics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

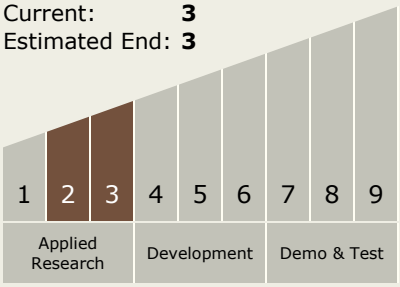
Carlos Torrez

Principal Investigator:

Yancey Sechrest

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Completed Technology Project (2017 - 2017)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.3 Optical Components

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System